

MIXER FOR VISCOUS FLUID

Field of the Invention

The present invention relates to a mixer; and more particularly to a mixer for viscous fluid.

5 Description of the Prior Art

Viscous fluids, such as concrete, mortar and the like which are frequently used to construct the existing buildings are generated by mixing sand, gravel or water at a predetermined rate. A conventional mixer for viscous fluid is interiorly provided with a rotary mixing shaft on which plural helical paddles are disposed; the
10 helical paddles are used to mix the viscous fluid. However, viscous fluid for different kinds of the buildings may have different compositions and viscosities, the same mixing shaft cannot generate different requirements of viscous fluid, and when the paddles are arranged at different angles on the shaft, the viscosity of the mixed viscous liquid will be different, in other words, one kind of mixing shaft can only
15 generate a single requirement of viscous liquid, so that the mixing shaft needs to be changed with the kind of the building. Since the mixing shaft is disposed in the mixer, the replacement of the mixing shaft is quite inconvenient.

The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

20 SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a mixer for viscous liquid which is applicable to the viscous liquids of different viscosities or different compositions by changing the installing angle of the paddles on the

respective shafts as desired, thus improving the degree of freedom in use.

In order to achieve the above objective, a mixer for viscous liquid in accordance with the present invention comprises a housing, at least one mixing shaft and a discharge unit.

5 The housing includes an inner mixing space which is provided for holding viscous liquid and includes at least one outlet in a bottom thereof;

 The mixing shaft includes a spindle and plural mixing units, the spindle includes a polygonal column, the mixing shaft is disposed in the mixing space of the housing and driven by a driving device to rotate, each of the mixing units includes a
10 first assembling element, a second assembling element and plural fixing assemblies, the first assembling element and the second assembling element are oppositely assembled to form an annular shape, the first assembling element and the second assembling cooperate to enclose the polygonal column, the fixing assemblies
15 penetrate the first assembling elements and the second assembling elements to fix the mixing unit on the spindle, one of the first assembling element and the second assembling element of the respective mixing units exteriorly includes an extending portion which is provided with a paddle.

 The discharge unit is disposed at a bottom of the housing and includes at least one stop plate for closing the outlet in the bottom of the housing.

20 Since the paddles are connected to the respective mixing units which can be assembled or disassembled easily, the user can change the installation angle and the connection of the paddles as desired, by such arrangements, the mixer for viscous liquid of the present invention is applicable to the viscous liquids of different

viscosities or different compositions, thus greatly improving the degree of freedom and convenience in use.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a mixer for viscous liquid in accordance with
5 the present invention;

Fig. 2 is an exploded view of a mixing shaft of the mixer for viscous liquid in accordance with a preferred embodiment of the present invention;

Fig. 3 is a plane view of the mixing shaft of the mixer for viscous liquid in accordance with the present invention;

10 Fig. 4 is a partial front cross-sectional view of the mixer for viscous liquid in accordance with the present invention;

Fig. 5 is an operational view of Fig. 4;

Fig. 6 is a schematic view of the discharge unit of the mixer for viscous liquid in accordance with the present invention;

15 Fig. 7 is a cross-sectional view of the mixing shaft of the mixer for viscous liquid in accordance with the present invention;

Fig. 8 is a cross-sectional view showing how the assembling elements of the mixing shaft in accordance with the present invention are disassembled;

20 Fig. 9 is a cross-sectional view showing how the angle of the assembling element of Fig. 8 is changed in accordance with the present invention;

Fig. 10 is a perspective view of a mixing shaft in accordance with another embodiment of the present invention;

Fig. 11 is a perspective view of a mixing shaft in accordance with another

embodiment of the present invention;

Fig. 12 is a perspective view of a mixing shaft in accordance with another embodiment of the present invention; and

Fig. 13 is a cross-sectional view showing that the polygonal column of the spindle of the mixer for viscous liquid in accordance with the present invention is hexagonal.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figs. 1-4, a mixer for viscous fluid in accordance with the present invention comprises a housing 10, at least one mixing shaft 20, and a discharge unit 30.

The housing 10 includes an inner mixing space 11 which is provided for holding viscous fluid. The mixing space 11 is provided with at least one outlet 111 at the bottom thereof. In the present embodiment, two outlets 111 are provided. The viscous fluid is selected from a group consisting of mortar, cement and concrete.

In the present embodiment, the mixer for viscous fluid in accordance with the present invention is provided with two mixing shafts 20. The mixing shafts 20 are disposed in the mixing space 11 of the housing 10, and each of the mixing shafts 20 is drivingly connected to a driving device X. The mixing shafts 20 are driven by the driving devices X to rotate in the mixing space 11. In the present embodiment, the driving device X is disposed inside or outside the housing 10. Each of the mixing shafts 20 includes a spindle 21, plural spacing rings 22 and plural mixing units 23. The spindle 21 includes a polygonal column 212 having two cylindrical ends 211. The polygonal column 212 can be hexagonal or octagonal. In the present

embodiment, the polygonal column 212 is octagonal. The spacing rings 22 are annular and shaped correspondingly to the polygonal column 212 in such a manner that the spacing rings 22 can be engaged on the polygonal column 212. Each of the mixing units 23 includes a first assembling element 231, a second assembling element 232 and plural fixing assemblies 233. The first assembling element 231 and the second assembling element 232 are oppositely assembled to form an annular shape, and each of the first assembling element 231 and the second assembling element 232 of each of the mixing units 23 is formed with a semicircular accommodating portion 234 at an inner side thereof and an abutting portion 235 outwards extending from the accommodating portion 234 thereof. The first assembling element 231 and the second assembling element 232 cooperate to enclose the polygonal column 212. The abutting portions 235 of the first assembling element 231 and the second assembling portion abut against the outer periphery of the polygonal column 212 of the mixing shaft 20. The accommodating portion 234 is provided for accommodation of the polygonal column 212 of the mixing shaft 20. The fixing assemblies 233 are bolts and nuts, and the fixing assemblies 233 penetrate the first assembling elements 231 and the second assembling elements 232 to fix the mixing units 23 on the mixing shafts 20. The second assembling element 232 of the mixing unit 23 exteriorly includes a cylinder-shaped extending portion 236 which is screwed with a curved sheet-shaped paddle 237. The spacing rings 22 and the mixing units 23 are alternately arranged on the polygonal column 212 of the mixing shaft 20.

The discharge unit 30 is disposed at the bottom of the housing 10 and

includes two stop assemblies 31, a connecting device 32, a connecting shaft 33 and a driving cylinder 34. The stop assembly 31 includes a guiding element 311 which is fixedly disposed on the housing 10, and the guiding element 311 is further connected to a stop plate 312. The stop plate 312 is guided by the guiding element 311 to open or close the outlet 111 at the bottom of the housing 10. The connecting device 32 includes a connecting block 321 having each of two opposite ends thereof connected to a connecting element 322. The connecting elements 322 are connected to the stop plates 312 of the stop assemblies 31, respectively. The connecting block 321 is connected to an extension rod 341 of the driving cylinder 34 through the connecting shaft 33. When the extension rod 341 of the driving cylinder 34 extends or retracts, the extension rod 341 will drive the connecting shaft 33 to make the connecting block 321 pivot, and then the connecting block 321 will drive the respective connecting elements 322 to move the respective stop plates 312 to open or close the outlets 111 at the bottom of the housing 10.

The aforementioned is the structural relationship of the respective components of the preferred embodiment in accordance with the present invention. The respective mixing shafts 20 are disposed in the housing 10 and driven by the driving devices X to rotate. When the driving devices X drive the respective mixing shafts 20 to rotate, the paddles 237 of the mixing shafts 20 will carry out the mixing operation. Since the mixing unit 23 is positioned on the polygonal column 212 of the mixing shaft 20 by oppositely assembling the first assembling element 231 and the second assembling element 232 together, the user can change the position and the installation angle of the mixing unit 23 by himself. As shown in Figs. 1-3, each of

the mixing units 23 is only provided with the paddles 237 on the second assembling element 232 thereof, and each two neighboring mixing units 23 are engaged on the mixing shaft 20 at different angles in such a manner that the respective mixing units 23 are separated from each other.

5 When the installation angle of the respective mixing units 23 needs changing, referring to Figs. 7-9, the fixing assemblies 233 of the respective mixing units 23 will be removed to separate the first assembling element 231 and the second assembling element 232, at this moment, the angles at which the first assembling element 231 and the second assembling element 232 are installed on the mixing
10 shaft 20 can be changed, so that the angle of the paddle 237 can be changed at the same time. By such arrangements, the arrangement and the angle of the paddles 237 of the mixing unit 23 can be adjusted as desired, so that the mixer of the present invention can be used to produce the viscous liquids of different viscosities or compositions.

15 In addition, as shown in Figs. 4-6, when the viscous liquid is fed in the housing 10, the outlets 111 in the bottom of the housing 10 will be sealed by the stop plates 312 of the discharge unit 30 to retain the viscous liquid within the mixing space 11 of the housing 10. After the mixing of the viscous liquid is finished, the driving cylinder 34 of the discharge unit 30 is controlled to make the extension rod
20 341 of the driving cylinder 34 retract, and when the extension rod 341 of the driving cylinder 34 retracts, the connecting shaft 33 connected to the extension rod 341 will be driven by the extension rod 341 to make the connecting block 321 pivot, at this moment, the connecting elements 322 connected at both ends of the connecting

block 321 will move synchronously with the connecting block 321 to drive the respective stop plates 312 pivot downwards, so that the respective stop plates 312 can move away from the outlet 111 of the housing 10 to open the outlets 111, and the viscous liquid fed in the housing 10 can flow out through the outlets 111. The discharge unit 30 can utilize the driving cylinder 34 to open or close the outlets 111 by moving the stop plates 312, so the reaction is quite quick, and the working efficiency is high. Besides the driving cylinder 34 in the present embodiment, the stop plates 312 can also be directly driven by a rotating shaft or rotating element.

Further referring to Fig. 10, the mixing units 23 of the respective mixing shafts 20 can also be connected to one another, by such arrangements, the mixer in accordance with the present embodiment of the present invention can generate a viscous liquid of a desired viscosity.

Please refer to Fig. 11, the two mixing shafts 20 are arranged in parallel, some mixing units 23 of the respective mixing shafts 20 are provided with a paddle 237, 239 on both the first assembling element 240 and the second assembling element 232, and others are only provided with the paddle 237 on the second assembling element 232, and some of the paddles 237 are separated from each other, some of the neighboring paddles 237 are connected to each other, and the two neighboring connected paddles 237 form a smooth arc. By such arrangements, the mixing shafts 20 can also produce a viscous liquid of a different viscosity. When the respective mixing shafts 20 are in use, since the first assembling element 240 and the second assembling element 232 of some of the mixing units 23 both have paddles 239, 237, the paddles 239, 237 can mix the viscous liquid at different zones in the

housing 10, in other words, can synchronously mix the viscous liquid adjacent to the inner wall of the mixing space 11 of the housing 10 and the viscous liquid located at the center of the mixing space 11 of the housing 10, thus enhancing the mixing uniformity while improving the mixing efficiency.

5 Furthermore, referring to Fig. 12, both the first assembling element 240 and the second assembling element 232 of the mixing unit 23 on the mixing shaft 20 include a paddle 239, 237. The extending portion 238 of the first assembling element 240, which is connected to the paddle 239, has a length D1, and the extending portion 236 of the second assembling element 232, which is connected to the paddle 10 240, has a second length D2. The two mixing shafts 20 are arranged in parallel in such a manner that the first assembling elements 240 and the second assembling elements 232 of the two mixing shafts 20 are oppositely arranged, and the first length D1 of the first assembling element 240 is smaller than the second length D2 of the opposite second assembling element 232, or the second length D2 of the 15 second assembling element 232 is smaller than the first length D1 of the opposite first assembling element 240, in other words, the first length D1 and the second length D2 should be different, avoiding the collision of the paddles 239, 237 of the two mixing shafts 20. Further, the paddles 239, 237 of plural mixing units 23 on the two mixing shafts 20 are connected to each other to make the paddles 239, 237 of 20 the two mixing shafts 20 form plural arcs, by such arrangements, the two mixing shafts 20 can produce a viscous liquids of another different viscosity and is also applicable to a viscous liquid with another different composition.

As known from the above description, the installation angle of the mixing

units 23 on the mixing shafts 20 can be adjusted as desired, and the respective paddles 239, 237 can be separated from each other or connected to each other to produce viscous liquids of different viscosities, improving the degree of freedom and flexibility in use. If the installation angle of the respective mixing units is changed, the mixer in accordance with the present invention can produce a viscous liquid of a different viscosity or a different composition of viscous liquid without changing the mixing shaft 20 or preparing many mixing shafts the angles of the paddles of which are different, thus reducing the cost. Furthermore, the respective mixing units are assembled in a simple manner, so the replacement and assembly are both convenient.

WHAT IS CLAIMED IS:

1. A mixer for viscous liquid comprising:

a housing including an inner mixing space, the mixing space being provided for holding viscous liquid and including at least one outlet in a bottom thereof;

5 at least one mixing shaft including a spindle and plural mixing units, the spindle including a polygonal column, the mixing shaft being disposed in the mixing space of the housing and driven by a driving device to rotate, each of the mixing units including a first assembling element, a second assembling element and plural fixing assemblies, the first assembling element and the second assembling element
10 being oppositely assembled to form an annular shape, the first assembling element and the second assembling cooperating to enclose the polygonal column, the fixing assemblies penetrating both the first assembling elements and the second assembling elements to fix the mixing units on the spindle, one of the first assembling element and the second assembling element of the respective mixing units exteriorly
15 including an extending portion which is provided with a paddle; and

a discharge unit being disposed at a bottom of the housing and including at least one stop plate for closing the outlet in the bottom of the housing.

2. The mixer for viscous liquid as claimed in claim 1, wherein the viscous liquid is selected from a group consisting of mortar, cement and concrete.

20 3. The mixer for viscous liquid as claimed in claim 1, wherein the housing includes two driving devices, and each of the driving devices is connected to one mixing shaft.

4. The mixer for viscous liquid as claimed in claim 1, wherein the polygonal

column includes two cylindrical ends.

5. The mixer for viscous liquid as claimed in claim 4, wherein the polygonal column is hexagonal.

6. The mixer for viscous liquid as claimed in claim 4, wherein the polygonal
5 column is octagonal.

7. The mixer for viscous liquid as claimed in claim 4, wherein the mixing shaft includes plural spacing rings, the spacing rings are annular and shaped correspondingly to the polygonal column in such a manner that the spacing rings are engaged on the polygonal column, the spacing rings and the mixing units are
10 alternately arranged on the polygonal column.

8. The mixer for viscous liquid as claimed in claim 4, wherein each of the first assembling element and the second assembling element of each of the mixing units is formed with a semicircular accommodating portion at an inner side thereof and an abutting portion outwards extending from the accommodating portion
15 thereof, the abutting portions of the first assembling element and the second assembling element of each of the mixing units abut against an outer periphery of the polygonal column of the mixing shaft, and the accommodating portion is provided for accommodation of the polygonal column of the mixing shaft.

9. The mixer for viscous liquid as claimed in claim 1, wherein the fixing
20 assemblies of the respective mixing units are blots and nuts.

10. The mixer for viscous liquid as claimed in claim 1, wherein the extending portion of the one of the first assembling element and the second assembling element of the respective mixing units is cylinder-shaped.

11. The mixer for viscous liquid as claimed in claim 1, wherein the paddles of the respective mixing units are curved sheet-shaped.

12. The mixer for viscous liquid as claimed in claim 1, wherein the housing includes two outlets, the discharge unit includes two stop assemblies, a connecting device, and a driving cylinder, each of the stop assemblies includes a guiding element which is fixedly disposed on the housing, and each of the guiding elements is further connected to a stop plate, the connecting device includes a connecting block having each of two opposite ends thereof connected to a connecting element, the connecting elements are connected to the stop plates of the stop assemblies, respectively, the connecting block is connected to an extension rod of the driving cylinder through a connecting shaft.

13. The mixer for viscous liquid as claimed in claim 1, wherein each of the first assembling element and the second assembling element of the respective mixing units exteriorly includes an extending portion which is provided with a paddle.

14. The mixer for viscous liquid as claimed in claim 1, wherein the driving device is disposed inside the housing.

15. The mixer for viscous liquid as claimed in claim 1, wherein the driving device is disposed outside the housing.